

King's Research Portal

DOI:

[10.1016/j.chiabu.2017.07.021](https://doi.org/10.1016/j.chiabu.2017.07.021)

Document Version

Publisher's PDF, also known as Version of record

[Link to publication record in King's Research Portal](#)

Citation for published version (APA):

Tomlinson, M., Jordans, M., MacMillan, H., Betancourt, T., Hunt, X., & Mikton, C. (2017). Research priority setting for integrated early child development and violence prevention (ECD+) in low and middle income countries: An expert opinion exercise. *Child Abuse and Neglect*, 72, 131-139.
<https://doi.org/10.1016/j.chiabu.2017.07.021>

Citing this paper

Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

General rights

Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the Research Portal

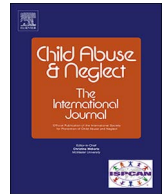
Take down policy

If you believe that this document breaches copyright please contact librarypure@kcl.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.



Contents lists available at ScienceDirect

Child Abuse & Neglect

journal homepage: www.elsevier.com/locate/chiabuneg

Research article

Research priority setting for integrated early child development and violence prevention (ECD +) in low and middle income countries: An expert opinion exercise



Mark Tomlinson^{a,*}, Mark Jordans^b, Harriet MacMillan^c, Theresa Betancourt^d,
Xanthe Hunt^e, Christopher Mikton^f

^a Stellenbosch University, South Africa

^b War Child Holland, Netherlands & King's College London, UK

^c McMaster University, Canada

^d Harvard University, USA

^e Stellenbosch University, South Africa

^f University of the West of England, UK

ARTICLE INFO

Keywords:

Early child development

Priority setting

Violence prevention

Integrated early childhood development

ECD +

ABSTRACT

Child development in low and middle income countries (LMIC) is compromised by multiple risk factors. Reducing children's exposure to harmful events is essential for early childhood development (ECD). In particular, preventing violence against children – a highly prevalent risk factor that negatively affects optimal child development – should be an intervention priority. We used the Child Health and Nutrition Initiative (CHNRI) method for the setting of research priorities in integrated Early Childhood Development and violence prevention programs (ECD +). An expert group was identified and invited to systematically list and score research questions. A total of 186 stakeholders were asked to contribute five research questions each, and contributions were received from 81 respondents. These were subsequently evaluated using a set of five criteria: answerability; effectiveness; feasibility and/or affordability; applicability and impact; and equity. Of the 400 questions generated, a composite group of 50 were scored by 55 respondents. The highest scoring research questions related to the training of Community Health Workers (CHWs) to deliver ECD + interventions effectively and whether ECD + interventions could be integrated within existing delivery platforms such as HIV, nutrition or mental health platforms. The priority research questions can direct new research initiatives, mainly in focusing on the effectiveness of an ECD + approach, as well as on service delivery questions. To the best of our knowledge, this is the first systematic exercise of its kind in the field of ECD + . The findings from this research priority setting exercise can help guide donors and other development actors towards funding priorities for important future research related to ECD and violence prevention.

1. Introduction

Reducing children's exposure to adversities that are known to compromise development is essential (Black et al., 2017). Violence – one of the major types of adversities – includes a broad range of exposures: child abuse and neglect, peer violence, as well as violence between caregivers and in the community. Violence against children is highly prevalent and is a risk factor for negative child

* Corresponding author.

E-mail address: markt@sun.ac.za (M. Tomlinson).

<http://dx.doi.org/10.1016/j.chiabu.2017.07.021>

Received 30 January 2017; Received in revised form 26 July 2017; Accepted 27 July 2017

0145-2134/ © 2017 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

outcomes (World Health Organization, 2009). In this article we follow the World Health Organization definition of violence as ‘the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, mal/development or deprivation’ and distinguished between “self-directed”, “interpersonal” and “collective violence World Health Organization (2014). Preventive intervention needs to take place as early as possible, before violence is learned and reinforced (Davis, Nageer, Cohen, Tepperman, & Biderman, 2002). Early Child Development (ECD) programs, however, rarely integrate violence prevention (VP), and, despite significant overlap between the ECD and VP fields, there is a lack of cross-cutting, integrated research and intervention approaches.

From a public health perspective, approaches within ECD and VP are both characterized by an emphasis on prevention and a focus on whole populations (see for instance, the Pathways to Prevention Project in the area of VP and Philani Mentor Mothers in the realm of ECD) (Hawkins, Von Cleve, & Catalano, 1991; Krug, Mercy, Dahlberg, & Zwi, 2002; Rotheram-Borus et al., 2011). Both use ecological models to understand risk factors and adopt a life-course perspective (see for instance, the work of the Centers for Disease Control with regard to VP and Headstart as an example in ECD) (Henry, Farrell, & The Multisite Violence Prevention Project, 2004; Webster-Stratton, Reid, & Hammond, 2001). The most effective ECD programs reach children early, address multiple risk factors, and are integrated across multiple disciplines (Britto et al., 2016). Combining ECD and VP may allow for more effective prevention and program implementation. Furthermore, a combined ECD and VP program is likely to increase the impact on both domains above and beyond focusing on both separately.

There is also considerable overlap between ECD and VP programs in the prevention of maltreatment (World Health Organization, 2009). The majority of child maltreatment programs – particularly those with evidence of effectiveness, such as specific home visiting programs or parenting programs – target outcomes that are traditionally viewed as ECD (see for instance the Nurse-Family Partnership model) (Duggan et al., 2004; Eckenrode et al., 2000; Olds, 2006; Thornton, Craft, Dahlberg, Lynch, & Baer, 2000). Improving parenting, parent-child relationships, and strengthening family functioning are all critical components (Betancourt et al., 2017). Similarly, many programs within the field of ECD share many features in common with child maltreatment programs – parenting programs and other programs to prevent child abuse and neglect chief amongst them (Britto, Yoshikawa, & Boller, 2011). The significant overlap between ECD and VP provides an opportunity to integrate ECD and VP programs, which is likely to be more cost-effective and increase impact. This overlap includes, but is not limited to, the focus of existing ECD programs on child protection, and their foregrounding of measures taken to protect children from violence, exploitation and abuse (Britto, Yoshikawa, & Boller, 2011). Similarly, a recent review of program characteristics and outcomes of Child Health Partnerships (ECD-focussed) showed that several of these also target VP (for instance, Every Chance for Every Child) (Jayaratne, Kelaher, & Dunt, 2010).

In light of the overlap between ECD and VP interventions, and with the aim of integrating the two, the setting of research priorities which bring together some of the factors at stake in debates and responses within an integrated (ECD +) framework, may help move the field of ECD + forward.

1.1. Research priority setting

The explicit and rational setting of priorities for investment in research is now accepted as an integral part of any research management process. Well managed priority setting has the potential to unite stakeholders, and bring together funders and/or donors, researchers in the public and private sectors, non-governmental organisations (NGO's), decision-makers in governments, and civil society. Most importantly, the act of priority setting provides guidance about the most appropriate allocation of public and private resources to areas of strategic importance. It can also serve to strengthen the role of global and national stakeholders as stewards of the research agenda (Tomlinson, Chopra, Hoosain, & Rudan, 2011; World Health Organization, 2007). The Child Health and Nutrition Initiative (CHNRI) method is a valuable framework for providing an objective, reliable, structured and transparent method required for priority setting (Rudan et al., 2007, 2008, 2010).

2. Methods

2.1. The CHNRI approach

The CHNRI method for setting priorities is a carefully developed and documented conceptual framework that is available in the public domain. It has demonstrated utility in several previous priority setting exercises such as disability, child health, global mental health and interpersonal violence (le Roux, Rotheram-Borus, Stein, & Tomlinson, 2014; Mikton et al., 2017; Tomlinson et al., 2007; Tomlinson et al., 2009a, 2009b), and is increasingly being employed by policy makers, prominent donors and international organizations (Rudan et al., 2007, 2008, 2010).

This method is based on the central tenets of, firstly, principal component analysis and, secondly, ‘wisdom of the crowds’ (Surowiecki, 2005). The former entails the reduction of a very complex system of large number of variables to a small number of relatively independent “principal components” which still capture a sizeable proportion of variation in the system, by defining each in terms of a set of criteria. The CHNRI process effectively reduces the complex and multi-dimensional task of priority setting, which could be approached through an almost infinite number of “lenses”, into an exercise where the most important (and reasonably independent) criteria for priority setting are clearly defined.

“Wisdom of the crowds”, as the name implies, refers to the process of taking into account the collective opinion of a group of individuals rather than a single expert (or small number of experts) to address a question (Surowiecki, 2005). Research has shown that

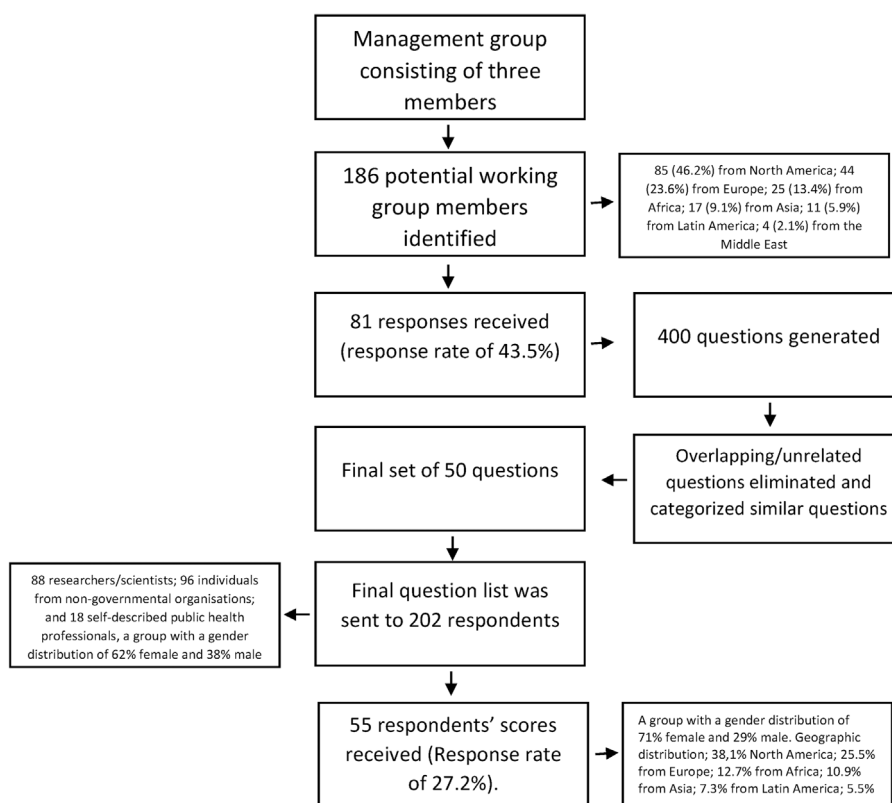


Fig. 1. Study flowchart. Establishment of a management group and a core group.

the average of collective guesses is nearly always closer to the truth than any one expert judgement (Surowiecki, 2005). The CHNRI approach takes this as axiomatic and as a result increases the likelihood that any evaluation being made will be closer to the 'correct' evaluation, than would be made by a single, or a few, individuals (Surowiecki, 2005). A final benefit is that it dilutes the personal biases which individuals inevitably bring to an evaluation.

The CHNRI method has shown excellent stability of scores with correlation coefficients of over 90% (Yoshida, Rudan, & Cousens, 2016). Due to its rigour, reliability and utility, the CHNRI method was employed to determine the research priorities for ECD+.

3. Procedure

3.1. Establishment of a management group

We established a management group consisting of five of the authors and one other (Laura Boone, LB). This group defined the context and the time frame, and outlined the framework for the priority setting, determining the criteria against which research options were judged. This group consisted of MT (an ECD researcher based in South Africa), MJ (a global mental health researcher based in the Netherlands), HM (a researcher working in violence prevention and mental health Canada), TB (a researcher working in public health in the United States), LB (a member of the International Rescue Committee), and CM (an expert in violence prevention based in the United Kingdom) (see Fig. 1 for an outline of the process).

3.2. Determining research criteria

The criteria against which the research options were assessed included answerability, effectiveness, feasibility and affordability, applicability and impact, and equity, and were identified by the management group based on a review of general research domains (See Table 1). In order to ensure that the exercise was feasible and that scoring of research options did not become unmanageable, a limit was set on the number of questions that were then to be evaluated per research option.

The management group compiled a list of the names of researchers, policy makers, and representatives from civil society and NGO's who formed the technical working group. This was done using professional networks of the six management group members and identifying key authors from the literature.¹ A broad search of PubMed using the terms ECD, and ECD and violence prevention, as

¹ We used a combination of search terms pertaining to *violence prevention* (e.g., *violen**, *violence presentation**), and *early child development* (e.g., *ECCD**, *early*

Table 1
Research criteria and guiding questions for their assessment.

| Criteria | |
|----------------------------------|---|
| Answerability | Is the research question clear and can a study can be designed to answer the research question and to reach the proposed aims of the research? Q1: Would you say that a study can be designed to answer the research question? Q2: Would a study that can answer the proposed research question be granted ethical approval? |
| Effectiveness | Based on the best existing evidence and knowledge, would the intervention which would be developed/improved through proposed research be effective? Q1: Based on the best existing evidence and knowledge, would the intervention which would eventually benefit from the proposed research be (or become) effective? |
| Feasibility and/or Affordability | Is the research potentially doable in the majority of countries in the world? Q1: Is a research study to answer this question feasible? Q2: Taking into account the level of difficulty with intervention delivery (e.g. the complexity of the intervention itself, the infrastructure required and human factors involved), would the proposed research be deliverable? |
| Applicability and Impact | Likelihood that the knowledge generated through the proposed research would be implemented and have an impact on policy and practice. Q1: Do you think that the proposed research would influence policy and practice and have an impact in changing current practice? Q2: Given the financial resources available to implement the intervention, would you say that its implementation would be affordable (scalable)? |
| Equity | Assessment of the impact of proposed research on equity Q1: Would you agree that the immediate results of the proposed research could be of help to all segments of the society, and not just the privileged ones? |

well as snowball sampling yielded a list of 186 possible members for the technical working group – the group responsible for generating and rating research questions, and scoring them. This expert group was geographically diverse, comprising 85 (45.7%) individuals from USA and Canada; 44 (23.7%) from UK and Europe; 25 (13%) from Africa; 17 (9%) from Asia; 11 (6%) from Latin America; and 4 (3%) from the Middle East.

Each member of the technical working group was then asked to generate five research questions. This took place over the course of approximately three weeks. A total of 186 respondents were asked to contribute five research questions each. Contributions were received from 81 respondents, including all six members of the management group (response rate of 43.6%), a process that generated over 400 questions. Similar questions were categorized, and duplicate questions, and those not related to ECD+, were removed, in order to reduce the number of questions to a manageable number. This process involved three rounds of consultations (via email and one face-to-face meeting between two of the authors). The remaining questions were then sent to the management group and through consultation the list was reduced further to a set of 50 questions.

3.3. Scoring process

We followed the CHNRI method closely, which specifies how data is analysed, scored and interpreted (Rudan et al., 2007, 2008, 2010). The final list of 50 questions was distributed to 202 persons who were asked to score each question independently using the CHNRI method. This group included 88 researchers/scientists; 96 individuals from NGOs and 18 public health professionals; and a gender distribution of 62% female and 38% male. These prospective respondents included all 186 members of the original technical working group (as well as an additional 10 persons who were added to the technical working group at this stage, based on referral from members who were present from the beginning of the process), and the management group ($n = 6$).

Detailed instructions were also sent to guide the scoring. Assistance by way of email was given throughout the process of scoring to answer queries regarding the scoring process. We received scores from 55 respondents, including all six members of the management group (a response rate of 27.3%). However, we received scores from 41 of the 81 respondents who submitted questions (a response rate of 50.6%). The respondents consisted of 27 researchers/scientists (49%), 25 individuals from NGO's (45%), and three individuals from the public health field (6%). The gender distribution was 71% female and 29% male, and the geographic distribution of respondents was 38% from USA/Canada; 25.5% from UK/Europe; 12.7% from Africa; 10.9% from Asia; 7.3% from Latin America; and 5.5% from Middle East.

Each expert scored each proposed research question by rating the question on each of the five criteria (no = 0 points, yes = 1 point or not sure = 0.5 points). In some instances experts may not have felt informed enough to answer a research option. In these cases answers were left blank. The method has an inbuilt mechanism for dealing with missing answers as it assumes that not all members of the technical working group will have the necessary knowledge to adequately score each possible research option against each criterion (Rudan et al., 2008). This stems from the method's reliance on the wisdom of crowds theory, where individuals in the

(footnote continued)

childhood', intervention'), within several scientific databases (PsycINFO, PsycARTICLES, GoogleScholar, and Web of Science). First authors of relevant manuscripts were contacted to take part in the exercise.

Box 1**Definitions.**

Management team – group of researchers, including six of the authors, who were responsible for the design and management of the priority setting exercise. They were responsible for defining the context, the time frame, and outlined the framework for the priority setting, determining the criteria against which research options were judged. This group was also responsible for the recruitment of experts to participate, a process which was guided by principles of diversity, gender, and sectoral representativeness.

Technical working group – a group of purposively sampled researchers, policy makers, representatives from civil society and NGOs identified by the management group. These individuals were responsible for generating and rating research questions. A total of 180 (not including management team members) (*) individuals were approached, 81 (*) responded with research questions, and 55 (*) scored the submitted questions.

rating process have the chance to express a judgement, judgements which include personal biases, and these tend to be cancelled out or diluted (Surowiecki, 2004; Tomlinson et al., 2014)

Intermediate research priority scores are calculated by summing all the non-blank answers (i.e., “1”, “0.5” or “0”) and dividing this sum by the number of non-blank answers. This results in research priority scores (RPS) between 0 and 100%. The RPS represents a score of how much the experts believes that the research options would satisfy the priority setting criteria (see Box 1; answerability, effectiveness, feasibility, applicability and impact, or equity; Rudan et al., 2008; ; Tomlinson et al., 2009). RPS's and average expert agreement scores were calculated for each research option.

This score represents a measure of the collective opinion of the experts scoring independently (Kapiriri et al., 2007; Rudan et al., 2008, 2007).

4. Results

Once the scored research questions were received, the management team organized the questions into a set of thematic goals (see Table 2). Integration with primary health care; Equity; Structural interventions; Community involvement and awareness raising; Establishing best practice; Parenting interventions; Exploratory research with environmental focus; Multi-sectoral and integrated approaches; and Basic science and epidemiology (see Table 3). In Table 3 we present the top two-three research options in each thematic goal (see Web Appendix A for a full list of all scored research options).

The top scoring research option was *“Can community health workers/para-professionals be trained to deliver ECD plus violence interventions effectively?”* This question was rated as highly answerable (94.8/100), effective (83.9/100), and was considered to be feasible and affordable (91.5/100) and equitable (89.6/100). It was recognized by this expert group as the best example of a question that would be most likely to generate new knowledge that could have beneficial, acceptable and equitable impact, with a total RPS of 90/100.

The most prevalent question theme was income strengthening approaches to ECD +. There were two questions about this area in the top 10 – *“What is the impact of income strengthening interventions (e.g., cash transfers, microfinance) on ECD outcomes and violence reduction?”* and *“Do combined ECD plus violence and income strengthening interventions have an incremental effect on early childhood development?”*. Both questions were rated as highly answerable (93.4/100 and 90.1/100 respectively), as well as equitable (89.6/100 and 88.7/100 respectively). A question concerning the make-up of effective ECD + programs, *“What are the essential components and mechanisms for combined ECD plus violence prevention programs to be most effective?”*, was also highly rated, scoring 86.8/100 on answerability and 87.2/100 on effectiveness.

Several questions concerning platforms of delivery were rated in the top 15 items. These included the most highly-rated research option (concerning the training of community health workers as discussed above), as well as questions regarding home-based versus group-based intervention (*What is the comparative effectiveness of group-based versus home-based delivery of ECD plus violence interventions?* Total RPS score of 82.5/100); school delivery (*Can training by teachers increase awareness among children and parents about how to prevent violence?* Total RPS score of 80.7/100); and delivery context more broadly (*What is the effectiveness of interventions that train caregivers at ECD centers or pre-primary school contexts in positive discipline strategies to replace abusive discipline practices in those settings?* Total RPS score of 83.9/100).

The lowest-scoring research option in the present exercise concerned the need to address gender role socialization in ECD + (*“Which components of ECD plus violence programs are likely to strengthen gender norms and roles that increase the risk of violence later in life?”*). This option did not fare well in the domains of effectiveness (46/100); applicability and impact (48/100) and feasibility and/affordability (48.5/100), scoring marginally better on the criteria of equity (62/100) and answerability (63/100), for a total RPS of 53.5/100.

Only one other question had a score below 50% for any criteria (*“What parenting interventions and care practices are targeting family situations after divorce or remarriage in particular to prevent child maltreatment including neglect?”*) with a score of 48/100 on applicability and/or impact. This item also scored poorly on answerability (56/100) and equity (57/100), although it was considered quite answerable (75/100), and feasible/affordable (66.5/100). The total RPS for this question was 60.5/100.

There were significant concerns about the effectiveness (55.1/100); feasibility and/or affordability (52.5/100), and applicability

Table 2
Prioritized research options.

| Thematic goals | Research Questions | Ranking | RPS* |
|---|---|---------|------|
| Integration with primary health care | Can community health workers/para-professionals be trained to deliver ECD plus violence interventions effectively? | 1 | 90 |
| | Can ECD plus violence interventions be integrated with existing delivery platforms such as HIV, nutrition or mental health platforms? | 3 | 70.6 |
| Equity | How can interventions that reduce violence against children and women and improve early child development be implemented without stigmatizing women? | 4 | 66 |
| | What kind(s) of ECD plus violence interventions for children with disabilities (including developmental delays and social/emotional/behavioural difficulties) prevent, and best respond to, violence toward children? | 15 | 76.5 |
| | Which components of ECD plus violence programmes are likely to strengthen gender norms and roles that increase the risk of violence later in life? | 22 | 53.5 |
| Structural interventions and income gathering | Do combined ECD plus violence and income strengthening interventions have an incremental effect on early childhood development? | 5 | 83.3 |
| | How do we integrate adult educational programming into ECD so that low income families can lower the economic stress that may increase the likelihood of violence? | 24 | 63.3 |
| | What social policies are considered effective for promoting healthy caregiver-child relationships in low and middle income countries? | 36 | 72.1 |
| Community involvement and awareness raising | What is the role of community participation and local leaders in ECD plus violence activities? | 6 | 75.7 |
| | Can training by teachers increase awareness among children and parents about how to prevent violence? | 12 | 80.7 |
| | How can we ensure that those children and families who need ECD plus violence services and support the most receive the services? | 18 | 70.8 |
| Establishing best practice | Are interventions that target multiple risks in families affected by domestic violence effective in reducing violence and promoting optimal development in early childhood? | 2 | 81.3 |
| | What are the essential components and mechanisms for combined ECD plus violence prevention programmes to be most effective? | 7 | 83.8 |
| | What is the optimal intervention delivery framework for a combined ECD plus violence program? | 11 | 75.3 |
| Parenting interventions | Do parenting programs reduce violence against children without any additional violence prevention component? | 8 | 67.7 |
| | Does a combined ECD and violence prevention program increase, keep the same, or decrease the effectiveness of evidence-based parent training? | 9 | 78.8 |
| | What are the most cost-effective parenting interventions for use in LMICs to promote ECD and reduce violence? | 10 | 81.3 |
| Exploratory research with environmental focus | How effective is ECD in preventing violence when high-risk situations (e.g. gangs, drugs) are present at later ages? | 17 | 61.9 |
| | What parenting interventions and care practices are targeting family situations after divorce or remarriage in particular to prevent child maltreatment including neglect? | 20 | 60.5 |
| | What is the role of siblings in improving resilience in violent households? | 26 | 70.5 |
| Multi-sectoral and integrated approaches | What are the advantages and disadvantages – from scientific, implementation, policy, and advocacy perspectives – of incorporating, partly or wholly, VAC prevention into ECD? | 25 | 66.9 |
| | How can agencies across different sectors/ministries coordinate effectively to address the multiple risks associated with violence against children in early childhood? | 28 | 73.2 |
| Basic science and epidemiology | What are factors explaining the pathways between ECD and violence against children? | 41 | 66.7 |
| | What are the causes and features of intergenerational transmission of violent discipline towards children among families in LMIC? | 23 | 72.6 |
| | What are the appropriate measures necessary to determine effectiveness of ECD plus violence programmes | 32 | 68.9 |

Note: RPS = Research Priority Score.

and impact (57.1/100), for the research question “*What are the research and delivery areas where a combination of these two fields (ECD and violence prevention) could make the biggest difference?*” Another low scoring option was “*How effective is ECD in preventing violence when high-risk situations (e.g. gangs, drugs) are present at later ages?*” This scored the lowest on the feasibility and/or affordability criterion (51.9/100), but scored only marginally higher on effectiveness (58.8/100) as well as applicability and/or impact (56.8/100).

5. Discussion

We applied the CHNRI method, a tried and tested approach for priority setting, to identify global research priorities in the area of integrated ECD and violence prevention programs (ECD+) (Tomlinson et al., 2009). The results clearly outlined the priorities for future research related to integrated ECD and violence prevention. The highest scoring research question related to the training of

community health workers to deliver ECD+ interventions effectively. This question attained an extremely high score, pointing to consensus regarding the desirability of such a focus in ECD+ research.

In many priority setting exercises the differences in scores between the top research question and the question in 10th place is as little as a few percentage points. In this priority setting exercise, there are four percentage points between the top research option and the second one, while the difference between the research options in the second and tenth positions is six percentage points. Such a phenomenon attests to the increasing recognition of the potential for community health workers as an invaluable resource in the delivery of health interventions, and in line with current global initiatives to deliver effective interventions in the context of weak health systems and poor human resource capacity (Singh & Sachs, 2013). Research is needed to explore the effectiveness of integrated ECD+ interventions delivered by community health workers in LMIC, and particularly in severely resource constrained countries and regions.

The prominence of an integrated ECD+ agenda, coupled with the focus on training teachers, and caregivers at ECD centers, points to the need to develop a research agenda in the area of ECD+. Global health interventions have been characterised by a ‘vertical’ silo approach (Panter-Brick, Eggerman, & Tomlinson, 2014), the net result of which has been the significant short-term success of interventions concerning ‘prominent’ global health issues such as HIV and neonatal mortality, at the expense of other priorities. It has also contributed little to health system strengthening. ECD+ offers, at least in theory, a model and program of action which is horizontally integrated and fundamentally targets multiple risk factors and multiple stakeholders within a given context.

A striking feature of our priority setting exercise was the relatively high final scores of the 50 questions when compared to other research priority-setting exercises using the CHNRI method. Recent work setting priorities for developmental disabilities (le Roux et al., 2014) using this method yielded a highest score for a research option of 74.29/100. In the present exercise, the highest score was 90/100. In a previous exercise the lowest RPS score was 35.37/100 (le Roux et al., 2014) while in the present exercise it was 53.5/100. However, a range of score more in line with our own was reported for priorities on the health of persons with disabilities (86.8/100 to 48.2/100) (Tomlinson et al., 2009a, 2009b).

It is difficult to determine the reasons for the relatively high scores in the current exercise. It may be due to the collective optimism and a sense of urgency of the group who scored the priorities. However, this difference in scores is likely also a function of the fact that most past priority setting exercises have included “basic science questions”, whilst this exercise did not. Instead we had many more practical questions, pertaining to prevention and intervention. It is possible that this explains the scoring group’s relative endorsement of tangible, practical research options.

The emphasis placed on research questions relating to establishing an evidence base on the impact of income strengthening on ECD programs integrated with violence prevention is also a noteworthy outcome of the present exercise. The prioritization of these issues is consistent with current trends in global research funding for social protection programs. Reasons for this include the increasing evidence base concerning the effectiveness of income strengthening and grants (Cluver et al., 2013; Fernald, Gertler, & Neufeld, 2008), as well as global research/donor funds concerns about the extent to which their funds reach the recipients for whom they are intended (Marmot, 2007). In the case of other forms of financial support, a large portion of funds may not reach communities and recipients, but rather go to universities, researchers, and NGO implementers with high overheads.

Although the CHNRI method provides a guide against which a variety of research options can be judged, final scores should be seen only as a guide to investment – investment decisions will always be driven by research funder and donor priorities. An example of this is the question “Do violence prevention programmes that focus on behaviour management improve cognitive stimulation?” This question scored quite poorly (position 42 out of 50), but for many researchers involved in the field of ECD+, an answer to this question would provide essential data for the design of more focussed and cost-effective interventions. A research study to answer this particular question using the time frame designed for this exercise, may not be seen to have an immediate impact, but would provide the data to design future interventions. The high score it achieved in this exercise for answerability (80.5/100) may be seen as sufficient evidence for a particular funder that it may be worth investing in – despite its low position in the overall research priority setting exercise and a score of 57/100 for applicability and impact.

A growing body of evidence draws attention to the fact that disparities in ECD set the scene for the emergence of health inequalities in later life (Gertler et al., 2014). The benefit of early intervention is now well established (Black et al., 2016). What is less clear is the extent to which a life-span approach, with a focus on ECD and violence prevention, may in fact prevent the onset of later (costly) mental illness (Collins et al., 2011). Interventions in the field of ECD+ offer significant potential to contribute to the prevention of later child maltreatment, improve child development, and reduce levels of later violence. Also, given their comprehensive nature and delivery – by definition – early in the life-span, ECD+ interventions offer real potential for reducing negative health, psychological and social outcomes over the long-term.

6. Limitations

The main limitations of this study relate to validity of the CHNRI approach and potential sampling biases. While 81 experts participated in generating the ‘research options’ that were rated, it is clearly impossible within such an exercise to attain comprehensive coverage of all possible research questions. As such, both the questions generated and the ratings allocated, are likely to reflect any biases in the identification, sampling and participation of experts. It is possible that many good ideas may not have been included in the initial list of questions to be scored. The CHNRI approach differs from consensus development approaches that are frequently used in two key respects: the CHNRI approach does not provide participants with a review of the evidence and there is no formal interaction between participants such as feedback of views or facilitated meetings. It is possible that such approaches would produce different results. The CHNRI approach was specifically designed to avoid biases that might arise from providing participants

with evidence reviews or allowing interaction between participants.

It is also necessary to reflect on the role of the management group in the priority-setting process, specifically, their influence in the compilation of candidates for the technical working group.

The management team drew on their professional networks in order to identify working group members. The pools of individuals from which they drew candidates would have been influenced by their professional background, research area, and geographic location. As a counterweight to any bias potentially introduced as a result of this, the list of candidate names was supplemented following a thorough search of ECD and VP literature. In line with priority-setting best practice, the management group were also guided by principles of diversity, gender, and sectoral representativeness in their recruitment of technical working group members.

A further limitation was the process of refining the final list of 50 questions in the first instance by two of the authors, and then in consultation with the other four management group members. It is possible that the pragmatic requirements of such an exercise – refining a cumbersome array of questions into well-framed research options – may have introduced bias. However, this process was minimised by the fact that the management's influence was limited to synthesis of existing questions, rather than elimination of options, or creation of new options. While it is not impossible that the phrasing of the final research options reflects the influence of the management group, it is highly implausible, given the democratic nature of all prior and subsequent steps of the process.

Another weakness is that the nature of the CHNRI method applied in this instance would have limited the participation of experts who were not fluent in English. All respondents in this case were fluent in English. Nevertheless the project was successful in eliciting research questions from 81 experts and ratings from 55 experts from around the world. The number of participants and the protection against potential bias provided by the CHNRI approach (e.g., by limiting interaction between participants) does reduce the probability that a similar group of experts would produce materially different results. As such, we believe that this research priority-setting exercise provides an important contribution to establishing a global research agenda for ECD+.

A lesser limitation of the present exercise was the response rate, which was low. However, although a response rate of less than 30% appears problematic, it is in line with the response rate of a number of other similar priority setting exercises (Tomlinson et al., 2009a, 2009b). Furthermore, as already stated, based on the wisdom of the crowds, the collective opinions of a small group of individuals (as little as 20) is sufficient (Surowiecki, 2005).

It is also worth discussing the potential impact of the gender distribution of the technical working group (71% female and 29% male). This limits the generalizability of the findings, and must be borne in mind in interpreting the findings presented here.

Finally, the relatively high scores achieved by research questions in this exercise need consideration. This finding may be due to the fact that ECD+ is a new domain of research and so the group of experts were more homogenous in opinion than in priority setting exercises concerning more well-established fields. However, it could be due to the fact that a greater proportion of individuals who submitted questions, then rated the questions, in comparison to those who did not. The high scores, then, may be attributable to individual members of the technical working group rating their own questions highly. In addition, the high number of implementation type priorities (rather than basic science questions) may have contributed to the high scores. In previous exercises, basic science priorities have tended to score poorly given their relative lack of impact (in the short term) on for example domains such as equity or reducing the disease burden.

7. Conclusions

This research priority-setting exercise has provided information from a group of experts, all with relevant experience, and provides an important contribution to establishing research agendas in the domain of ECD+. To our knowledge, this is the first systematic exercise of its kind. The findings from this research priority-setting exercise will be useful in guiding the international research agenda and making research funding more effective in responding to the needs of children. The key research questions to be answered following this study are around the potential for successful and effective implementation of ECD+, the income strengthening potential of ECD+, and more efficient delivery platform for ECD+. The present exercise has provided grounds for the sound orientation of further research and service development in the area of ECD+.

Funding

This work was supported by UBS Optimus Foundation, Switzerland.

Acknowledgements

We acknowledge the core group who gave of their valuable time to score research options. MT is a lead investigator with the Centre of Excellence in Human Development, University Witwatersrand, South Africa, and is supported by the National Research Foundation, South Africa.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.chiabu.2017.07.021>.

References

- Betancourt, T. S., Ng, L. C., Kirk, C. M., Brennan, R. T., Beardslee, W. R., Stulac, S., ... Sezibera, V. (2017). Family-based promotion of mental health in children affected by HIV: A pilot randomized controlled trial. *Journal of Child Psychology and Psychiatry*, 58, 922–930. <http://dx.doi.org/10.1111/jcpp.12729>.
- Black, M. M., Walker, S. P., Fernald, L. C. H., Andersen, C. T., DiGirolamo, A. M., Lu, C., ... Lancet early childhood development series steering committee (2017). Early childhood development coming of age: Science through the life course. *Lancet*, 389(January (10064)), 77–90.
- Britto, P. R., Yoshikawa, H., & Boller, K. (2011). Quality of early childhood development programs in global contexts: Rationale for investment, conceptual framework and implications for equity. *Social Policy Report*, 25(2).
- Britto, P. R., Lye, S. J., Proulx, K., Yousafzai, A. K., Matthews, S. G., Vaivada, T., ... Fernald, L. C. (2016). Nurturing care: Promoting early childhood development. *The Lancet*, 389, 91–102. [http://dx.doi.org/10.1016/S0140-6736\(16\)31390-3](http://dx.doi.org/10.1016/S0140-6736(16)31390-3).
- Cluver, L., Boyes, M., Orkin, M., Pantelic, M., Molwen, T., & Sherr, L. (2013). Child-focused state cash transfers and adolescent risk of HIV infection in South Africa: A propensity-score-matched case-control study. *The Lancet Global Health*, 1(6), e362–e370. [http://dx.doi.org/10.1016/s2214-109x\(13\)70115-3](http://dx.doi.org/10.1016/s2214-109x(13)70115-3).
- Collins, P. Y., Patel, V., Joestl, S. S., March, D., Insel, T. R., Daar, A. S., ... Stein, D. J. (2011). Grand challenges in global mental health. *Nature*, 475(7354), 27–30. <http://dx.doi.org/10.1038/475027a>.
- Davis, R., Nageer, S., Cohen, L., Tepperman, J., & Biderman, F. (2002). *First steps: Taking action early to prevent violence*. California, USA: Prevention Institute. Oakland, California, Retrieved from https://www.preventioninstitute.org/sites/default/files/publications/1stSTEPS_exec%20summ_WEB_040511.pdf.
- Duggan, A., McFarlane, E., Fuddy, L., Burrell, L., Higman, S. M., Windham, A., & Sia, C. (2004). Randomized trial of a statewide home visiting program: Impact in preventing child abuse and neglect. *Child Abuse & Neglect*, 28(6), 597–622. <http://dx.doi.org/10.1016/j.chiabu.2003.08.007>.
- Eckenrode, J., Ganzel, B., Henderson, C. R., Jr, Smith, E., Olds, D. L., Powers, J., ... Sidor, K. (2000). Preventing child abuse and neglect with a program of nurse home visitation: The limiting effects of domestic violence. *JAMA*, 284(11), 1385–1391. <http://dx.doi.org/10.1001/jama.284.11.1385>.
- Fernald, L. C., Gertler, P. J., & Neufeld, L. M. (2008). Role of cash in conditional cash transfer programmes for child health, growth, and development: An analysis of Mexico's Oportunidades. *The Lancet*, 371(9615), 828–837. [http://dx.doi.org/10.1016/S0140-6736\(08\)60382-7](http://dx.doi.org/10.1016/S0140-6736(08)60382-7).
- Gertler, P., Heckman, J., Pinto, R., Zanolini, A., Vermeersch, C., Walker, S., ... Grantham-McGregor, S. (2014). Labor market returns to an early childhood stimulation intervention in Jamaica. *Science*, 344(6187), 998–1001. <http://dx.doi.org/10.1126/science.1251178>.
- Hawkins, J. D., Von Cleve, E., & Catalano, R. F. (1991). Reducing early childhood aggression: Results of a primary prevention program. *Journal of the American Academy of Child & Adolescent Psychiatry*, 30(2), 208–217. <http://dx.doi.org/10.1097/00004583-199103000-00008>.
- Henry, D. B., Farrell, A. D., & The Multisite Violence Prevention Project (2004). The study designed by a committee: Design of the multisite violence prevention project. *American Journal of Preventive Medicine*, 26(1), 12–19. <http://dx.doi.org/10.1016/j.amepre.2003.09.027>.
- Jayarathne, K., Kelahe, M., & Dunt, D. (2010). Child Health Partnerships: A review of program characteristics, outcomes and their relationship. *BMC Health Services Research*, 10(1), <http://dx.doi.org/10.1186/1472-6963-10-172>.
- Kapiriri, L., Tomlinson, M., Chopra, M., El Arifeen, S., Black, R. E., Rudan, I., ... Nutrition Research (2007). Setting priorities in global child health research investments: Addressing values of stakeholders. *Croatian Medical Journal*, 48(5), 618–627. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2213572/pdf/CroatMedJ_48_0618.
- Krug, E. G., Mercy, J. A., Dahlberg, L. L., & Zwi, A. B. (2002). The world report on violence and health. *The Lancet*, 360(9339), 1083–1088. [http://dx.doi.org/10.1016/S0140-6736\(02\)11133-0](http://dx.doi.org/10.1016/S0140-6736(02)11133-0).
- le Roux, I. M., Rotheram-Borus, M. J., Stein, J., & Tomlinson, M. (2014). The impact of paraprofessional home visitors on infants' growth and health at 18 months. *Vulnerable Child & Youth Studies*, 9(4), 291–304. <http://dx.doi.org/10.1080/17450128.2014.940413>.
- Marmot, M. (2007). Achieving health equity: From root causes to fair outcomes. *The Lancet*, 370, 1153–1163. [http://dx.doi.org/10.1016/S0140-6736\(07\)61385-3](http://dx.doi.org/10.1016/S0140-6736(07)61385-3).
- Mikton, C. R., Tanaka, M., Tomlinson, M., Streiner, D. L., Tonmyr, L., Lee, B. X., ... MacMillan, H. L. (2017). Global research priorities for interpersonal violence prevention: A modified Delphi study. *Bulletin of the World Health Organization*, 95(1), 36–48. <http://dx.doi.org/10.2471/BLT.16.172965>.
- Olds, D. L. (2006). The nurse-family partnership: An evidence-based preventive intervention. *Infant Mental Health Journal*, 27(1), 5–25. <http://dx.doi.org/10.1002/imhj.20077>.
- Panter-Brick, C., Eggerman, M., & Tomlinson, M. (2014). How might global health master deadly sins and strive for greater virtues? *Global Health Action*, 7, 23411. <http://dx.doi.org/10.3402/gha.v7.23411>.
- Rotheram-Borus, M. J., Le Roux, I. M., Tomlinson, M., Mbewu, N., Comulada, W. S., Le Roux, K., ... Greco, E. (2011). Philani Plus (+): A Mentor Mother community health worker home visiting program to improve maternal and infants' outcomes. *Prevention Science*, 12(4), 372–388. <http://dx.doi.org/10.1007/s11121-011-0238-1>.
- Rudan, I., Gibson, J., Kapiriri, L., Lansang, M. A., Hyder, A. A., Lawn, J., ... Nutrition Research, I (2007). Setting priorities in global child health research investments: Assessment of principles and practice. *Croatian Medical Journal*, 48(5), 595–604. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/17948946>.
- Rudan, I., Chopra, M., Kapiriri, L., Gibson, J., Ann Lansang, M., Carneiro, I., ... Black, R. E. (2008). Setting priorities in global child health research investments: Universal challenges and conceptual framework. *Croatian Medical Journal*, 49(3), 307–317. <http://dx.doi.org/10.3325/cmj.2008.3.307>.
- Rudan, I., Kapiriri, L., Tomlinson, M., Balliet, M., Cohen, B., & Chopra, M. (2010). Evidence-based priority setting for health care and research: Tools to support policy in maternal, neonatal, and child health in Africa. *PLoS Medicine*, 7(7), e1000308. <http://dx.doi.org/10.1371/journal.pmed.1000308>.
- Singh, P., & Sachs, J. D. (2013). 1 million community health workers in sub-Saharan Africa by 2015. *The Lancet*, 382(9889), 363–365. [http://dx.doi.org/10.1016/S0140-6736\(12\)62002-9](http://dx.doi.org/10.1016/S0140-6736(12)62002-9).
- Surowiecki, J. (2005). *The wisdom of crowds*. New York: Anchor Books.
- Thornton, T. N., Craft, C. A., Dahlberg, L. L., Lynch, B. S., & Baer, K. (2000). *Best practices of youth violence prevention: A sourcebook for community action*. Centers for Disease Control Atlanta, USA.
- Tomlinson, M., Chopra, M., Sanders, D., Bradshaw, D., Hendricks, M., ... Greenfield, D., Rudan, I. (2007). Setting priorities in child health research investments for South Africa. *PLoS Medicine*, 4(8), e259. <http://dx.doi.org/10.1371/journal.pmed.0040259>.
- Tomlinson, M., Rudan, I., Saxena, S., Swartz, L., Tsai, A. C., & Patel, V. (2009a). Setting priorities for global mental health research. *Bulletin of the World Health Organization*, 87(6), 438–446. <http://dx.doi.org/10.2471/blt.08.054353>.
- Tomlinson, M., Swartz, L., Officer, A., Chan, K. Y., Rudan, I., & Saxena, S. (2009b). Research priorities on the health of persons with disabilities: An expert opinion exercise. *The Lancet*, 374, 1857–1862. [http://dx.doi.org/10.1016/S0140-6736\(09\)61910-3](http://dx.doi.org/10.1016/S0140-6736(09)61910-3).
- Tomlinson, M., Chopra, M., Hoosain, N., & Rudan, I. (2011). A review of selected research priority setting processes at national level in low and middle income countries: Towards fair and legitimate priority setting. *Health Research Policy and Systems*, 9(1), <http://dx.doi.org/10.1186/1478-4505-9-19>.
- Webster-Stratton, C., Reid, M. J., & Hammond, M. (2001). Preventing conduct problems, promoting social competence: A parent and teacher training partnership in head start. *Journal of Clinical Child Psychology*, 30(3), 283–302.
- World Health Organization (2007). *Sound choices: Enhancing capacity for evidence-informed health policy*. Retrieved from http://www.who.int/alliance-hpsr/resources/Alliance_BR.pdf.
- World Health Organization (2009). *Preventing violence through the development of safe, stable and nurturing relationships between children and their parents and caregivers*. Retrieved from http://apps.who.int/iris/bitstream/10665/44088/1/9789241597821_eng.pdf.
- World Health Organization (2014). *Global Status Report on Violence Prevention* Geneva: WHO.
- Yoshida, S., Rudan, I., & Cousens, S. (2016). Setting health research priorities using the CHNRI method: VI. Quantitative properties of human collective opinion. *Journal of Global Health*, 6(1), <http://dx.doi.org/10.7189/jogh.06.010503>.